



The Cooperative Institute for Climate Science (CICS) at Princeton University is a NOAA Cooperative Institute sponsored by NOAA's Geophysical Fluid Dynamics Laboratory (GFDL). Princeton University and GFDL established a collaborative program in 1967 via a memorandum of understanding which was converted to a Cooperative Institute in October 2003.

CICS conducts research under four research themes: (1) **Earth System Studies and Climate Research** – Develop fundamentally new atmospheric, oceanic and land models, and do basic research in land dynamics and hydrology, ocean dynamics, large-scale atmospheric dynamics, chemistry and radiative forcing, and clouds and moist convection; (2) **Biogeochemistry** - Assist in the development of land and ocean biogeochemistry components of the Earth System model and develop inverse and data assimilation models of atmospheric, oceanic, and terrestrial carbon observations to determine the large scale distribution of carbon sources and sinks around the world; 3) **Coastal Processes** - Collaborate with a coastal modeling group to develop tools linking climate change to coastal circulation to inform decision makers; and 4) **Paleoclimate** - Support research on critical issues such as the changing response of the climate to solar insolation forcing, the cause of glacial/interglacial carbon dioxide changes, and the significant climate trends that have occurred within the Holocene.

CICS scientists published 30 scientific publications annually of which 85% appeared in peer-reviewed publications. CICS publications are rapidly increasing with 26 scientific publications in 2003-04 and 55 in 2004-05. Some of the research includes Earth System modeling at GFDL and Princeton, which is now emerging from an intense period of model development. During this period, CICS has worked with GFDL to produce new atmospheric, oceanic, and land models; coupled models; chemistry-radiative forcing models; cloud resolving models with new microphysics; and a non-hydrostatic limited area model. Although these models are already producing useful products, new and more realistic models will be required to meet future NOAA goals. A major contribution of CICS is to the development of the new GFDL Earth System Model for which CICS is providing major components of the land and ocean biogeochemistry modules. Traditionally the main models used for climate prediction at GFDL have not included processes like tides and bottom boundary layers that play a dominant role in the dynamics of the coastal zone. This is why CICS has proposed to collaborate with a coastal modeling group. The most valuable observational constraints that there are to test the understanding of the response of the Earth System to changes in forcing comes from the geological and ice core records. This is why CICS is supporting research on critical issues such as the changing response of the climate to solar insolation forcing.

CICS research activities assist NOAA in three of its Mission Goals: 1) Protect, restore and manage the use of coastal and ocean resources through ecosystem-based management; (2) Understand climate variability and change to enhance society's ability to plan and respond; and (3) Serve society's needs for weather and water information. The primary focus is on the second of these.

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